

Pressure study of molecular magnet based on 3D and 4D metals: critical point

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The pressure measurements of magnetic materials give the opportunity to study the fundamental aspects of magnetism. In this study a molecular ferromagnet $\{[\text{Co}^{II}(\text{pyrazole})_4]_2[\text{Nb}^{IV}(\text{CN})_8] \cdot 4\text{H}_2\text{O}\}$ has been studied with the use of ac/dc magnetometry under hydrostatic pressure up to 1.3 GPa. The studied compound crystallizes in the $I4_1/a$ space group where cyanido-bridged structure is decorated with pyrazole molecules coordinated to Co^{II} centers. It is a unique structure with one type of Co^{II} -NC-Nb IV linkage. The spin values of both magnetic ions are 1/2, with $g_{\text{Co}} \approx 4.55$, $g_{\text{Nb}} \approx 2.0$ for cobalt and niobium respectively. The phase transition in ambient pressure occurs at $T_c = 5.4$ K. Initially applying pressure shifts the temperature of phase transition to lower values down to a critical point, after which further applied pressure starts to increase the T_c . Phase diagram was established on the basis of ac susceptibility measurements.

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